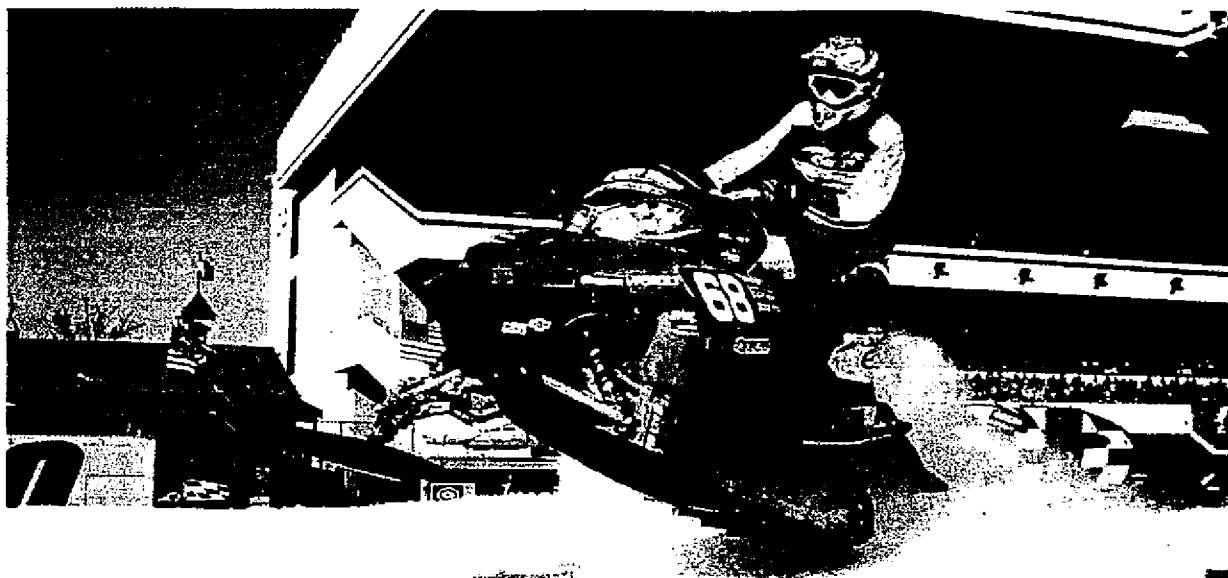


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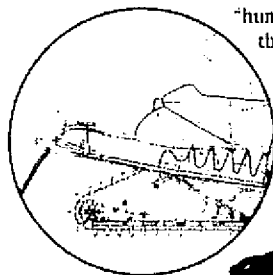
ARCTIC CAT SNO PRO 440

ABOVE: Tucker Hibbert was a double pro stock winner on the rookie Firecat Sno Pro stocker in 2002 and the technology is further refined for 2004 in Year Three of this radical Cat chassis.

In maybe one of the gutsiest moves ever to occur in snowmobile racing, Arctic Cat's racing program abruptly moved away from its successful ZR platform back in 2002. This famous and successful sled - in its three iterations over the years - was arguably the single most successful racer of all time, owning the snocross limelight from its introduction in 1993 until its retirement after the 2001 season.

In this span of eight years, the sled changed significantly but the basic package remained true to the concepts that made it a rookie winner and a durable champion.

You could quibble about changes along the way like the "hung motor," the tilt tunnel, the extruded bulkhead and the rest, but the ZR was essentially the same sled throughout that amazing eight-year run. It had a feel and a character that was, and is, unique in snowmobiling.



The tilt is gone, replaced by a straight tunnel profile that increases stiffness while it lifts the seat and adds clearance underneath.



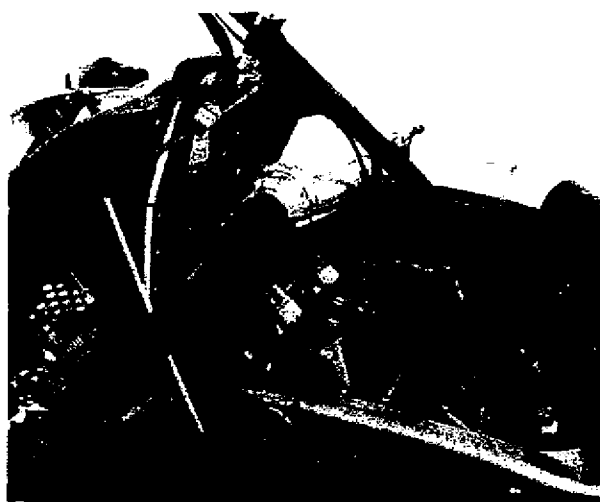
The Sno Pro for 2002 changed all that. The chassis we know now as the Firecat came along with a narrower, longer track, a rear tilted cogging, a driveshaft-mounted brake, an unequal angle A-frame, a stamped and welded bulkhead and a driver forward ergo package that was as different from a ZR as we could imagine.

At the time, we wondered in print about the wisdom of this move. AC walked away from a sled that was still on top of its game to embrace a radical new concept. Proving our fears at least partly unjustified, Tucker Hibbert swept the pro classes with the rookie Cat in 2002. But that first season was not without its growing pains. The holeshot was problematic, the sled was a bear in the corners and, by mid-season, only a handful of drivers on the major circuits remained competitive on a sled that needed its edges seriously honed.

For 2003, the Sno-Pro got some tweaking in the form of a lowered rear suspension (raised driver position), 1.5-inch track lugs, steeper spindle angles, a high-compression engine and a revised Cross-Link track suspension. The sled was way better last season, but the progress of the Ski-

Doo REV introduced at the same time continued unabated as well and the yellow brand quickly dominated the amateur classes in 2003. In the hands of former Cat star Blair Morgan, the REV stockers and modifieds topped most pro podiums as well.

It's now year three of the "skinny Cat" project and there's no doubt the 3rd edition



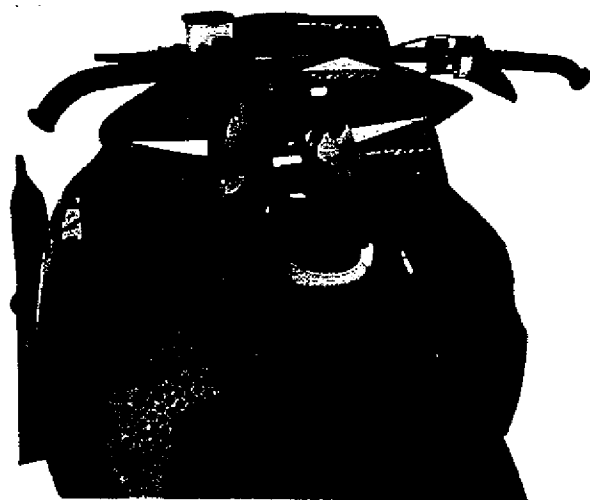
The shift to steering post positioned forward of the engine looks natural on the tilt motor Cat chassis. Well-crafted extrusions and excellent positioning of components make this layout look like it was planned all along.

of the Arctic Cat pictured here is the best ever.

The most noticeable change is the switch to a steering post mounted ahead of the engine. AC has done a stellar job with this bit of engineering, making the new layout look as planned and natural as Adam meeting Eve. With a smooth new steering hoop on top, a centrally positioned post forward about three inches and a new angle approaching the optimum for driver control, the latest Cat Sno Pro embraces the driver forward trend with both paws.

Part of the new ergo package is a much smaller fuel tank holding only 5 gallons and a revised cockpit with a wrapover seat and substantially more knee and elbow room. There are no gauges, only a centrally mounted tether.

Underneath, the Sno-Pro displays a revised bulkhead that rolls forward two degrees to lift the chassis low point under the engine, remove two degrees from the fore-aft spindle angle and drop the tilted motor slightly. A quarter inch longer upper A-arm strips off a small amount of camber to further sharpen the corner response in 2004. High-zoot Fox Zero-X shocks are in position to control movement on the skis.



The cockpit area is way different. Gone is the big fuel tank and dash, in its place a narrow, minimal layout designed to give the rider room to move.

In back, the dual angle tunnel is replaced with a straight tunnel that simply draws a line across the former angle to make the tunnel a bit deeper—and way stronger.

Reflecting experience with the needs of snowcrossers these days, the new Cat has no footholds but heaps of traction surface on the footrests and tunnel roll. Shorter hooks on the handlebars, deeper footrests and a choice of handlebar riser heights should tailor the sled to any size and shape rider.

There's a holeshot button on the handlebars, a technique now being used by all makers, and the hydraulically linked Cross-Link suspension adds a separator piston to more precisely control flow between the two track suspension shocks.

Motor news includes a move to three-port exhaust—said to pump the motor up to 104 HP—plus a larger, tougher airbox, revised pipe sensor controlled ignition and a fatboy style expansion chamber. The transmission sports the now all but universal (in racing) Team Performance twin capture ramp secondary.

The sled is said to weigh a few lbs more than the 03, but we suspect the skinny Cat will once again be lightest overall as the boys in green roll out to clash and bash in the bump and jump wars this winter. ▲

POLARIS PRO-XR 440



Unless you look closely you'll miss the changes to the 2004 Pro-XR. Fact is, the rider has been moved several inches forward to get the weight more centralized.

You'd have to be dead from the lips up or at least more interested in rug hooking than snowmobile racing to have missed out on the legend called Indy. The Indy started as a terrain (XC) racing sled in 1980 and it dominated the sport of Cross Country racing and the early days of snowcross like, well, nothing else.

Okay, we can hear some snow-s fans crowing how the ZR was a bigger legend in the 90's and Ski-Doo is already on a roll with terrain racing dominance. Shut-up, already. Polaris was the act, they were the collective "man." They dominated snowmobile terrain racing for almost 15 years. Just because you're still shaving peach fuzz and have a limited sense of history, the reality of the Indy legend doesn't change. Polaris set the stage for the arrival of what we now know as a "limited build racer." Without belaboring the point here, until Arctic Cat arrived with a credible ZR 440 limited in 1993, Polaris ruled everything to do with terrain.

That's changed. Polaris arguably allowed their dominance to slide in the middle 1990's and slid it did. First AC then SD turned up the wick and saw the hay Polaris race success had made both from a marketing perspective and from a research and design viewpoint. The Polaris

Close up close

program was simple. They raced what they sold and sold what they raced. So elementary was the scheme it took the competition nearly a decade to catch on. Polaris built light, tough, well-suspended, dependable race sleds. They also spun a hugely successful marketing program using the name Indy - a name which became a bonafide legend.

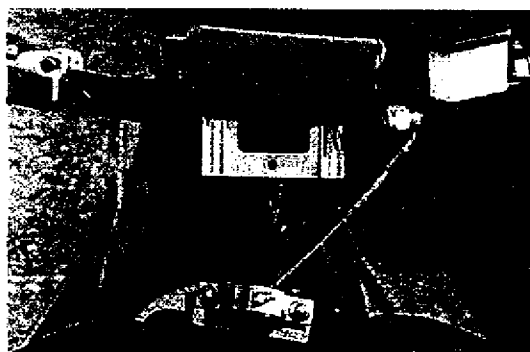
In 1999, when Polaris finally awoke from their middle 90's Rip Van Winkle impersonation, they produced an all-new chassis called Edge (Excellent Design Equals Greater Excitement). The name Indy stayed with the Edge for one model year then was unceremoniously retired. Still, the all-new Edge used the familiar trailing arm IFS so many Indys had carried before. As a 440 Limited Build the 1999 Edge was a disaster and the Roseau brain trust suf-



ABOVE: By decreasing the rake of the spindles, the engineers have made the Pro-X carve harder in the corners. Also, the distance between the steering stops was opened up so the skis could be turned sharper.

LEFT: Obviously a race shop, limited build item is the ragged angle of the repositioned steering post as it reaches from under the hood to the handlebars.

BELOW: Almost four inches was hacked off the back of the hood and the footrests were moved forward considerably. This view shows part of the steering support structure in front of the gas tank.



fered many sleepless nights attempting to keep the Edge racer in one piece for that first winter of competition.

In subsequent years it appeared Polaris was back. The press releases proclaimed the 440 Edge then the 440 Pro-X were improving. In fact they were improving - from a reliability standpoint - but it wasn't until the 2003 Pro-X hit the ground anyone really paid much attention. Continually plagued by recalcitrant cornering and poor chassis durability it took a gargantuan effort to bring the radical looking '03 Pro-X to the race track. Since that day, the Pro-X has been building steady credibility with the racing fraternity.

Here's another problem: Ski-Doo brought the REV to the market in 2003 and set everyone on their heels with new rider forward ergonomics. Polaris made it through 2003 delivering a revised version of the Pro-XR with handlebars and rider jammed further forward in an attempt

to address the stand-up posture racers were now screaming for.

In 2004 Polaris has taken the Pro-XR 440 to a new level. The one area which persistently frustrated Pro-X pilots was the sled's reluctance to turn inside and down low. This year the handlebar pole is moved way forward so the post actually runs in front of the engine and is now supported by a tripod like structure above the engine. This in turn required shortening of the hood's trailing edge by almost four inches and moving of the footrests much further forward and flattening them to 15 degrees. The net effect of these changes pushes the rider's feet on top of the front arm snubber, bringing rider mass dramatically closer to the engine and the drive-line center weight point.

Combining all this front weighting with an increase in the amount of travel in the steering linkage and decreasing spindle rake transforms the Pro-XR into an inside, down low, turning maniac. Polaris claims the turning radius is now 33 percent tighter. Reports from Polaris test pilots who ran the new geometry and ergos late last year clearly verify the sled is now capable of turning low on anything from snow to concrete. Still, this chassis has not moved the engine rearward, flipped it backwards or tipped the motor onto the tunnel. Any of these tricks would net even stronger

mass centralization benefits and better airborne handling.

A new tunnel stamping with wider footrests completes the chassis changes. The bodywork is at best cobby but is indicative of the treatment being used by Arctic Cat on their Sno-Pro 440 this year. If we had to guess, we don't think this hood will be around much longer. It really doesn't serve its purpose now: the handlebars emerge from a spot very close to the instrument pod.

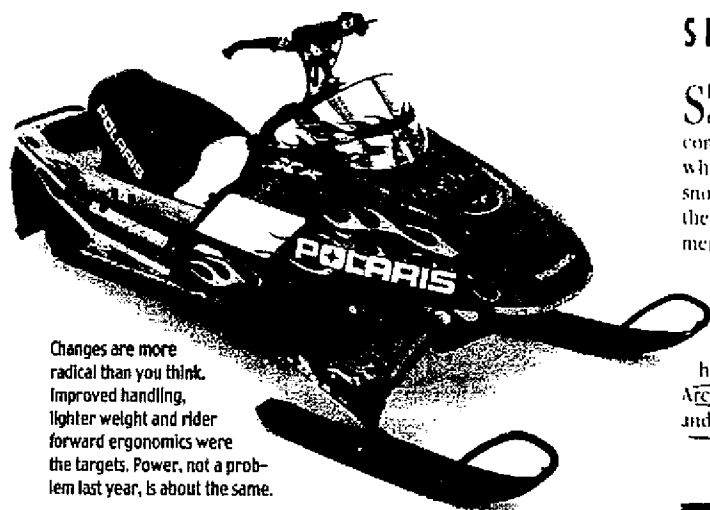
Polaris has seriously reworked the drive line of the Pro-XR using a rifle drilled drive axle, a new chain case, sprockets and a 1-1/2 inch wide, 1.75 inch lug track. Their powerful dual piston, liquid cooled Hayes Phantom binder is improved as well.

Polaris has also massaged their Liberty 440 with V-Force reeds and an improved Dragon ignition system designed to heat the pipe for heroic holeshots.

Suspension bits supplied by Walker Evans are massaged and clutching is provided by Polaris up front and TEAM Performance out back. Polaris' relationship with TEAM Industries is rooted in their ATV division. Strangely enough the industry standard TEAM Industries racing secondary is strikingly similar to the Polaris ATV secondary cast by the same company.

The big question is this: Will the Pro-XR 440 be enough to assault the now legendary REV and meet the Arctic Cat Sno-Pro 440 at the fin-





Changes are more radical than you think. Improved handling, lighter weight and rider forward ergonomics were the targets. Power, not a problem last year, is about the same.

ish line? Clearly, Polaris has done more radical stuff this year than in the past four years of Pro-X 440 development. The sled still looks conventional because of its familiar edge hood and trailing arm design, however any sno-x aficionado can see this is one radically re-packed snowmobile.

The stakes are high for Polaris this season as they truly need to deliver racing results as the market intensifies its focus on race derived technology thus driving consumer sales and creating showroom sizzle. There's another force at play here which makes Polaris path in 2004 somewhat complicated. We have it all but confirmed the Roseau race shop is readying an all-new, A-frame based, rider forward Open Mod package undoubtedly destined for production. If this is true, Polaris will be moving rapidly to integrate this new chassis into much of its production snowmobile plans and of course, it's future racing 440. Copious deductive insight is not required to conclude you're likely looking at the last trailing arm, Edge based Polaris racing sled.

In the same way the Indy came and went, so will the Edge. However, we think the 2004 Polaris Pro-XR 440 is likely the very highest form of the Edge species. The sled truly holds promise for Polaris this season and if all the hype is only partially true, this may be Polaris' year in the winner's circle.

Still, at the end of the day, whatever Polaris rolls out of their factory racing trailers in Open Mod racing this winter will tell us much more about Polaris future than the Pro-XR 440 covered here.



This spacer block, which moves the bars into a more vertical position, is indicative of Polaris' determination to provide the best possible stand-up ergos for racers.

SKI-DOO'S REV 440

Ski-Doo has built a credible reputation in sno-cross since the arrival of the first 440 S-chassis X models in the mid-90's. Previously, the company was tinkering with gigantic, F-Body based motorized ingots which were neither exceptional cross country racers or stand out sno-cross weapons. When the first 440X's using the S chassis appeared, the plan began to get. Bombardier was not satisfied to be perceived as merely credible at terrain racing, they wanted to be number one. At that time in history, thinking of Ski-Doo as the #1 terrain racing snowmobile maker was laughable to all but a few dedicated visionaries in a small Quebec, Canada, village.

The succession of S chassis to ZX then to REV racing platforms has been nothing short of staggering. Using much of what took both Arctic Cat and Polaris to legendary sno-x and terrain status in the 80s and 90s, Ski-Doo methodically honed their racing sleds in response to



Hardly standing pat with what they have raced the past two years, Ski-Doo has focused more on durability and debugging.

the changing trend toward sno-cross. Obviously, the ZX was a strong performer, good in the humps, almost unbeatable in the turns and most importantly, as reliable a racing mount as the sport had ever seen. While Polaris struggled with Edge based 440s that refused to stay glued together, Ski-Doo went after Arctic Cat's legendary dominance with the simpler - and again - more reliable ZX.

At one point two years ago, this publication crowed the praises of the racing ZX as the new dominant player in sno-cross. While some staffers stayed true to Arctic Cat's ZR as the racing leader, results seemed to indicate the ZX was the act to beat. Ski-Doo then sat at a crossroads. The ZX was based on trailing arm technology using familiar ergonomics and simple suspension designs that were proving themselves both bulletproof and highly effective. Why not stay with this formula and continue to gently refine what was known as one of terrain racing's finest packages?

Here's why. The goal in the early 90's was to not be the bridesmaid; the goal was to win, to dominate, to annihilate the competition. For those who may not know, this mindset is a genetic distinctive of the French Canadian psyche. The racing heritage at Bombardier runs deep and their dominant performance in oval racing, spanning two decades, is proof of this commitment.

With this drive to win firmly in place at Ski-Doo, the move to advance the state of the modern sno-cross weapon was a simple

1000 up close

choice. Essentially, Ski-Doo re-invented snowmobile ergonomics with the launch of the racing REV platform in late 2001. The REV required component "shuffling" beyond anything we had seen thus far. The rider forward posture, which resulted from the REV's ergo overhaul, more closely resembled that of an ATV or a dirt bike. This posture allowed for the rider to stand up when attacking terrain and to move around on the sled in a manner not previously seen in this business. The rest, as they say, is history. Ski-Doo dominated snow racing in the 2003 season winning every meaningful championship in North America. The REV was here to stay.

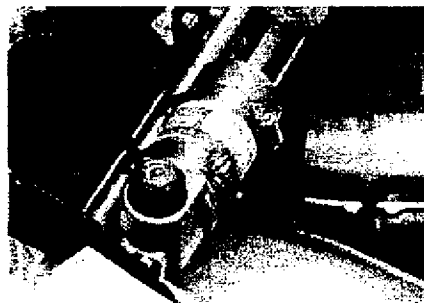
Under the REV's radical bodywork are surprisingly tame, off-the-shelf ZX derived components. In 2004, the 440 limited REV uses another updated version of the torquey, tough cylinder reed mill debuted in the 1999 ZX 440. The rear skid is a mildly evolved version of the SC-10 III skid used the past couple years in both the 2003 REV 440 and the 2002 ZX 440. Driveline components do not stand out as exceptional departures from the norm either. The primary clutch is Bombardier's lighter weight and tougher racing TRA. The chaincase is an updated version of the unit used since the ZX first landed. What is new and a striking departure for 2004 is the use of the industry standard TEAM Performance captured roller secondary and a new, unusual sprocket drive system.

The sprocket system combines the old with the new by using both convolute - through-track-window external drive-lugs with involute



ABOVE: Ski-Doo's new drive sprockets are both involute and convolute and are designed to reduce the possibility of track ratcheting.

RIGHT: Aluminum bodied, remote reservoir shocks have both compression and rebound clickers for max adjustability.



depth was 1.25 inches.

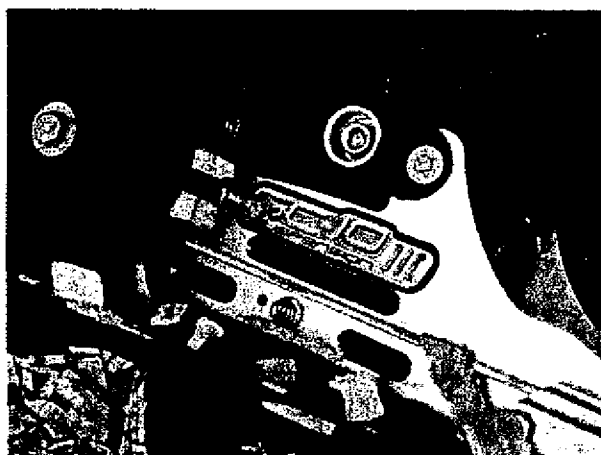
Essentially, the REV is the goal line in 2001. Proof of this enviable role is on these pages. The changes made to both the Arctic Cat Sno-Pro and the Polaris Pro-XR 440 clearly transform these sleds into REV's - or should

we say Pevs and Cevs - ergonomically speaking. While each version contains distinct nuances, essentially, both Polaris and AC, are moving the driver forward and centralizing their sleds total (driver and chassis) mass near the rider's feet.

Did Ski-Doo need to do more with the REV 440 for 2004? While sitting still was not an option for Ski-Doo, we would have to say the REV still has enough stuff to deal with the competition this year. However, the gap which Ski-Doo enjoyed last year has narrowed... substantially. We suspect race results will demonstrate more parity among brands as a result of changes to both the Sno-Pro and the Pro-XR.

Are the changes made to the REV significant enough to keep it ahead of the competition? We think the real ace for Ski-Doo this year will be reliability. The other makers have made significant engineering and manufacturing changes to their 440s. As with any new racing vehicle, there will be teething. Ski-Doo's updates are relatively minor and as a result, the REV 440 should be even more durable than it was last season. This alone could be the most significant contributing factor to the success of the 2004 REV 440.

One final thought on the REV 440. It's interesting how Ski-Doo has been able to integrate the basic ergos of the racing REV directly into their production sleds. The trail based REV platform is scary close to the racing 440 in almost every feature and dimension thus giving Ski-Doo a marketing and production advantage over the competition.



SC-10 III skidframe is mostly unchanged from last year except for a wider distance between the bump stops to allow increased transfer for better holeshot potential. Wood chips are not included.